

FIGS. 2 and 3 are schematic diagrams illustrating the external appearance and internal construction of the information recording and reproducing apparatus, wherein:

FIG. 2 is a front view of the information recording and reproducing apparatus; and

FIG. 3 is a side view of the information recording and reproducing apparatus;

FIG. 4 is a plan view illustrating a display/operation panel;

FIG. 5 is a block diagram illustrating the configuration of a controller;

FIG. 6 is a functional block diagram of a CPU used in the first embodiment;

FIGS. 7 to 9 are flow charts illustrating the operation process of the information recording and reproducing apparatus according to the first embodiment of the invention, wherein:

FIG. 7 is a flow chart illustrating a pre-process;

FIG. 8 is a flow chart illustrating a copying process; and

FIG. 9 is a flow chart illustrating a post-process;

FIG. 10 is a block diagram illustrating the configuration of an information recording and reproducing apparatus according to second and third embodiments of the present invention;

FIG. 11 is a functional block diagram of a CPU used in the second embodiment;

FIG. 12 is a flow chart illustrating an operation process from the beginning to the start of a copying process in the information recording and reproducing apparatus according to the second embodiment of the invention;

FIG. 13 is a functional block diagram of a CPU used in the third embodiment; and

FIGS. 14 and 15 are flow charts illustrating an operation process in the information recording and reproducing apparatus according to the third embodiment of the invention, wherein:

FIG. 14 is a flow chart illustrating an operation process from the beginning to the start of a copying process; and

FIG. 15 is a flow chart illustrating a copying process.

DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENTS

A first embodiment according to the present invention is described below referring to FIGS. 1 through 9.

In this embodiment, the invention is applied to an information recording and reproducing apparatus for exchangeable recording media, where the information recording and reproducing apparatus has the capability of copying information from a master medium to a plurality of copying media. In this embodiment as described below, it is assumed that magneto-optical disks are employed as the exchangeable recording media, whereas the invention may also be applied to apparatus designed to use other types of exchangeable media such as phase-change optical disks, CD-Rs, floppy disks, optical servo-control floppy disks, etc.

As illustrated in FIG. 1, the information recording and reproducing apparatus according to the present embodiment includes: a disk drive unit 1a serving as master medium reproducing means for reading data from a master disk mounted in the disk drive unit 1a; a plurality of copying disk drive units 1b, 1c, 1d, and 1e serving as copying-medium recording means for writing the data onto disks mounted in

these copying disk drive units; and a controller 2 serving as copying operation controlling means for controlling the above-mentioned disk drives.

The master and copying disk drive units 1a through 1e are connected to the controller 2 via two separate SCSI (small computer system interface) buses 3a and 3b. In the particular example shown in FIG. 1, the disk drive units 1a, 1b, and 1c are connected to the controller 2 via the SCSI bus (1) 3a, whereas the disk drive units 1d and 1e are connected to the controller 2 via the SCSI bus (2) 3b, so that control commands and data can be transmitted between these disk drive units and the controller 2 via the SCSI buses 3a and 3b.

The apparatus also includes: a display/operation panel 4 for displaying the operation status of the apparatus; and drive LEDs 5a through 5e serving as indicators for indicating the status of each disk drive unit, wherein display/operation panel 4 and the drive LEDs are connected to the controller 2. Each drive LED 5a-5e includes two LEDs such as green and red LEDs acting as error indicating means wherein the red LED is turned on when an error occurs in the corresponding disk drive unit. There is also provided a power supply unit 6 connected to various parts of the apparatus such as the disk drive units 1a-1e, the controller 2, and the display/operation panel 4 so as to supply electrical power to these elements.

FIGS. 2 and 3 illustrate the external appearance and the inward construction of the information recording and reproducing apparatus of the embodiment. FIG. 2 is a front view of the apparatus, and the FIG. 3 is a side view of the same apparatus. In FIG. 3, the side of the enclosure is removed so that the inside of the apparatus can be seen.

All parts of the information recording and reproducing apparatus are housed in the enclosure 10 in such a manner described below. The display/operation panel 4 is disposed on the front side of an enclosure 10, and the disk drive units 1a through 1e are arranged one on another below the display/operation panel 4 wherein the display/operation panel 4 and the disk drive units 1a-1e are exposed to the outside through the front side of the enclosure. The drive LEDs 5a-5e are disposed on the front panel at the sides of corresponding drive units 1a-1e. A control circuit board 11 on which the controller circuit 2 is mounted is disposed below the disk drive units 1a-1e. The power supply unit 6 is disposed at the bottom of the enclosure 10.

A holder 12 is attached to each disk drive unit 1a-1e so that each disk drive unit is held on the corresponding holder 12 wherein the protrusions 12a formed at both sides of each holder 12 are fitted to brackets disposed on both sides of the enclosure 10. Rails 13a are disposed on the brackets 13 at heights equally spaced corresponding to the positions of disk drive units 1a-1e so that disk drive units 1a-1e can be inserted into the enclosure 10 from its back side toward its front side along the rails 13a disposed on the brackets 13 thereby installing the disk drive units 1a-1e in the enclosure.

Rails 13b are also disposed at the lower part of the brackets 13 so that the control circuit board 11 held by the board holder 14 can be inserted into the enclosure 10 along the rails 13b thereby installing the control circuit board 11 in the enclosure 10.

An AC power unit 6a including a power switch 15 and AC inlet and outlet 16 is disposed at the back of the power supply unit 6 disposed at the bottom of the enclosure 10 wherein the power switch 15 and AC inlet and outlet 16 are exposed to the outside via the back panel. Furthermore, cooling fans 17 are each disposed at the back of each disk drive unit 1a-1e so as to cool the disk drive units by